

Competency-Based Education Task/Competency List

Introduction to Engineering

8490 – 36 Weeks

Competencies designated by bullets in the left-hand column(s) are considered essential statewide and are required of all students. In some courses, all competencies have been identified as essential. Unbulleted competencies and/or locally added competencies should be included as local conditions permit.

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8490 36 Wks	Introduction to Engineering TASK/COMPETENCY
	Relating Objectives of the Course to Standards in Technological World
•	1. Describe the effects of the explosion in scientific knowledge on the development of technology.
•	2. Explain the pressing need for more engineers and technicians in the future.
•	3. Explain the purpose and functions of the technological team.
•	4. Participate in group work and personnel system to manage class and laboratory activities.
•	5. Apply safety rules to laboratory activities.
	Investigating the Engineering Profession and Related Careers
•	6. Summarize the characteristics of professional engineers.
•	7. Describe the principal fields for specialization in engineering.
•	8. Describe procedures for becoming a registered engineer.
•	9. Describe education needed for specialty fields in engineering and technology.
•	10. Identify benefits of study of the humanities and social sciences.
•	11. Demonstrate a professional attitude toward classroom and laboratory activities.
•	12. Describe the management responsibilities of engineers.
	Applying Engineering Graphics, Computer Software, and Measurement Instruments
•	13. Distinguish among various measurement systems and their base units.
•	14. Write a mathematical equation that is constant in units of measurement.
•	15. Interpret drawings, using various systems of measurement.
•	16. Use the precision measuring tools and instruments to lay out, measure, and inspect parts or products.
•	17. Solve problems involving measurement of quantities of materials, using SI Units and U.S. Customary Units.
•	18. Use engineering design graphics and descriptive geometry in the solution of design problems.
•	19. Sketch objects to show orthographic and pictorial views.
•	20. Use basic technical drawing instruments to draw orthographic and isometric projections.
•	21. Use appropriate methods to solve and report solutions of repetitive mathematical data, empirical equations, mechanisms, computations, and observations of physical test data.
•	22. Use graphical vector analysis in the design process.
•	23. Build models that illustrate principal classes of physical models.
•	24. Use computer-aided manufacturing (CAM) software to simulate a manufacturing problem.
•	25. Program computer-aided machines and numerical controls.
	Citing the Contribution of Engineering in History
•	26. Explore the history of engineering.
•	27. Conduct research on an engineering achievement.
•	28. Deliver a short oral briefing to explain a technical device or engineering achievement.
	Working with the Fundamentals of Problem Solving
•	29. Apply steps in the problem-solving method or process.
•	30. Function as an engineer or technologist in problem-solving activities.
•	31. Apply mathematical formulas to problems and activities.
•	32. Perform keyboard functions on a scientific, hand-held calculator.
•	33. Use appropriate computer application programs to solve problems.

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	Analyzing the Science and Properties of Materials
•	34. Describe the physical and chemical properties of engineering materials in terms of their internal structure.
•	35. Use tools and laboratory apparatus and equipment to determine the properties of materials.
•	36. Conduct laboratory tests and report results in written test report.
•	37. List causes of failure in materials and identify procedures used to prevent such failures.
•	38. Explain the concept of supply and demand as it relates to materials in short supply.
•	39. Experiment with processes used with metal, wood, polymer, ceramic, and composite materials and adhesives.
	Working with Different Processors to Solve Problems
•	40. Work as a team member to apply various methods to solve an assigned problem.
•	41. Apply different materials to solve an assigned problem to redesign or test a device.
•	42. Use mathematical symbols to express a relationship between two or more variables.
	Communicating Technical Information
•	43. Explain the importance of communication between engineers and their clients.
•	44. Write a proposal for an engineering project.
•	45. Write a technical report for an engineering activity.
•	46. Use a computer to word process technical information.
	Using the Design Process to Improve a Device or System
•	47. Select a problem or project for improvement.
•	48. Use the steps in the design process to improve a product.
	Gathering Information about Problems and Solutions
•	49. Identify references found in a technical library.
•	50. Identify publications used by engineers and the source of each.
•	51. List and define the six legal categories of patents.
•	52. Explain how patents are obtained.
•	53. Describe how patents protect the inventor.
	Managing the Team Concept of Engineering Design
•	54. Explain the importance of teamwork in problem solving.
•	55. Describe the use of a feasibility study.
•	56. List and define the essential steps in the preliminary design phase.
•	57. List and define the essential steps in the detailed design phase.
•	58. Use course experiences to participate in TSA as a leader, manager, or team member.

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